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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,509	09/26/2001	Cem Basceri	6047-59403	3307

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[REDACTED] EXAMINER

THOMAS, TONIAE M

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2822

DATE MAILED: 05/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Offic Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/965,509	BASCERI ET AL. R	
	<b>Examiner</b>	<b>Art Unit</b>	
	Toniae M. Thomas	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10 March 2003.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 30-50 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 30-50 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 26 September 2001 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.
 

If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
  - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ .                                   |

## DETAILED ACTION

1. This Office action is an official response to the amendment filed on 10 March 2003. The amendment added claims 43-50.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 30-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laibowitz et al. (US 5,926,360) in view of Kang (US 5,786,259).

#### Regarding claims 30-33, 36, and 42

Laibowitz et al. disclose a capacitor structure (fig. 4 and col. 6, lines 8-31). The capacitor structure comprises the following elements: a support structure 40 (fig. 4); a conductive layer having a pitted surface 43 (fig. 4); a layer of dielectric material 44 disposed on the pitted surface (fig. 4); and a continuous layer of conductive material 46 disposed on the layer of dielectric material (fig. 4). The conductive layer 43 is formed on a first conductive layer 42. Together, the conductive layers form the lower electrode of a capacitor structure.

Laibowitz et al. teach that the conductive layer having the pitted surface may be selected from a material selected from one of Pt, Pd, Au, Ag, Rh, Re, Ir, Os, and Ru.

However, Laibowitz do not teach that the conductive layer having the pitted surface is a conductive metallic oxide layer or, more specifically, a ruthenium oxide layer.

Kang discloses a capacitor structure (figs. 10-18 and accompanying text). The capacitor structure comprises a first conductive layer 213 and a second conductive layer 215 (fig. 13). Together, the first and second conductive layers form the lower electrode of the capacitor structure. Kang teaches that the second conductive layer 213 of the lower electrode may be a conductive material selected from a Pt group metal, such as Pt, Ru, Ir; or a conductive material selected from an oxide of a Pt group metal, such as  $\text{IrO}_2$ ,  $\text{RuO}_2$ , or  $\text{OsO}_2$  (col. 5, line 58 – col. 6, line 13).

It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to form the conductive layer 43 from an oxide of a Pt group metal (e.g.  $\text{RuO}_2$ ) because, as Kang teaches, oxides of Pt group metals may be used in place of Pt group metals as the material used for lower electrodes in capacitor structures.

#### Regarding claims 37-41

Laibowitz et al. disclose a capacitor structure in an integrated circuit (fig. 4 and col. 6, lines 8-31). The structure comprises: a layer of conductive material 42 with islands 43 disposed thereon (fig. 4); a layer of dielectric material 44 disposed conformally on the islands (fig. 4). A layer of conductive material 46 is disposed conformally on the layer of dielectric material (fig. 4). Together, the layer of conductive material 42 and the islands 43 form the lower electrode of a capacitor structure.

Laibowitz et al. teach that the islands may be formed of a material selected from one of Pt, Pd, Au, Ag, Rh, Re, Ir, Os, and Ru. However, Laibowitz do not teach that the

islands are formed of a conductive metallic oxide or, more specifically, a ruthenium oxide.

As discussed above, Kang discloses a capacitor structure (figs. 10-18 and accompanying text). The capacitor structure comprises a first conductive layer 213 and a second conductive layer 215 (fig. 13). Together, the first and second conductive layers form the lower electrode of the capacitor structure. Kang teaches that the second conductive layer 213 of the lower electrode may be a conductive material selected from a Pt group metal, such as Pt, Ru, Ir; or a conductive material selected from an oxide of a Pt group metal, such as  $\text{IrO}_2$ ,  $\text{RuO}_2$ , or  $\text{OsO}_2$  (col. 5, line 58 – col. 6, line 13).

It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to form the islands 43 from an oxide of a Pt group metal (e.g.  $\text{RuO}_2$ ) because, as Kang teaches, oxides of Pt group metals may be used in place of Pt group metals as the material for lower electrodes in capacitor structures.

Regarding claims 43-47 and 50

Claims 43-47 and 50 are rejected over the combination of Laibowitz et al. and Kang as discussed above with respect to claims 30-33, 36, and 42. However, neither Laibowitz et al. or Kang teach, separately or combined, that the pits are associated with a metallic phase or ruthenium phase in the conductive layer. Since this limitation deals with how the pits are formed, it is a process limitation and is, therefore, not relevant to the product. “Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of

a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). Therefore, claims 43-50 are taken to be unpatentable over the combination of Laibowitz et al. and Kang.

Regarding claims 34, 35, 48, and 49

Laibowitz et al. do not teach that the pits have a mean diameter in the range of one to three times the thickness of the conductive layer, or that the pits in the surface have a mean closest distance that is at least two times a thickness of the layer of the dielectric material. However, it would have been obvious to one having ordinary skill in the art, at the time the invention was made to provide the pits with a mean diameter in the range of one to three times the thickness of the conductive layer, and having a mean closest distance that is at least two times a thickness of the layer of the dielectric material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233). Therefore, the mean diameter and mean closest distance of the pits is taken to be obvious over the combination of Laibowitz et al. and Kang.

Art Unit: 2822

***Responses to Arguments***

3. Applicant's arguments with respect to claims 30-42 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*TMJ*

May 19, 2003



Mary Wilczewski  
Primary Examiner